

Long-term modulations in the decadal climate variability over the North Pacific

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Observations for the post-war period suggest that (quasi-) decadal climate variability over the wintertime North Pacific may have undergone notable modulations. A 20-year segmented EOF analysis of 3-year running-mean anomalies of the North Pacific SST reveals that the subarctic oceanic frontal zone was the primary center of action of the extratropical decadal SST variability until the 1980s. The SST variability there exhibits high correlation with the decadal variability of the surface Aleutian Low and a PNA-like pattern aloft but no significant simultaneous correlation with the tropical SST variability. Though extracted in the second EOF, however, this extratropical ocean-atmosphere variability has lost its predominance in the 1990s and 2000s. Instead, the primary center of action has shifted to the subtropical oceanic frontal zone, where the decadal SST variability that accompanies the variability of the subtropical anticyclone is strongly anti-correlated with the tropical SST variability that has enhanced since the 1980s. A 150-year CGCM integration is found to simulate similar long-term modulations both in the decadal variability over the extratropical North Pacific SST and in the associated atmospheric variability.

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